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METHOD AND APPARATUS FOR MATERIAL PROCESSING

Inventors: Paul E. Denney et al.

Filed.: March 18, 2004 Atty Docket: LOMASR.021CP1

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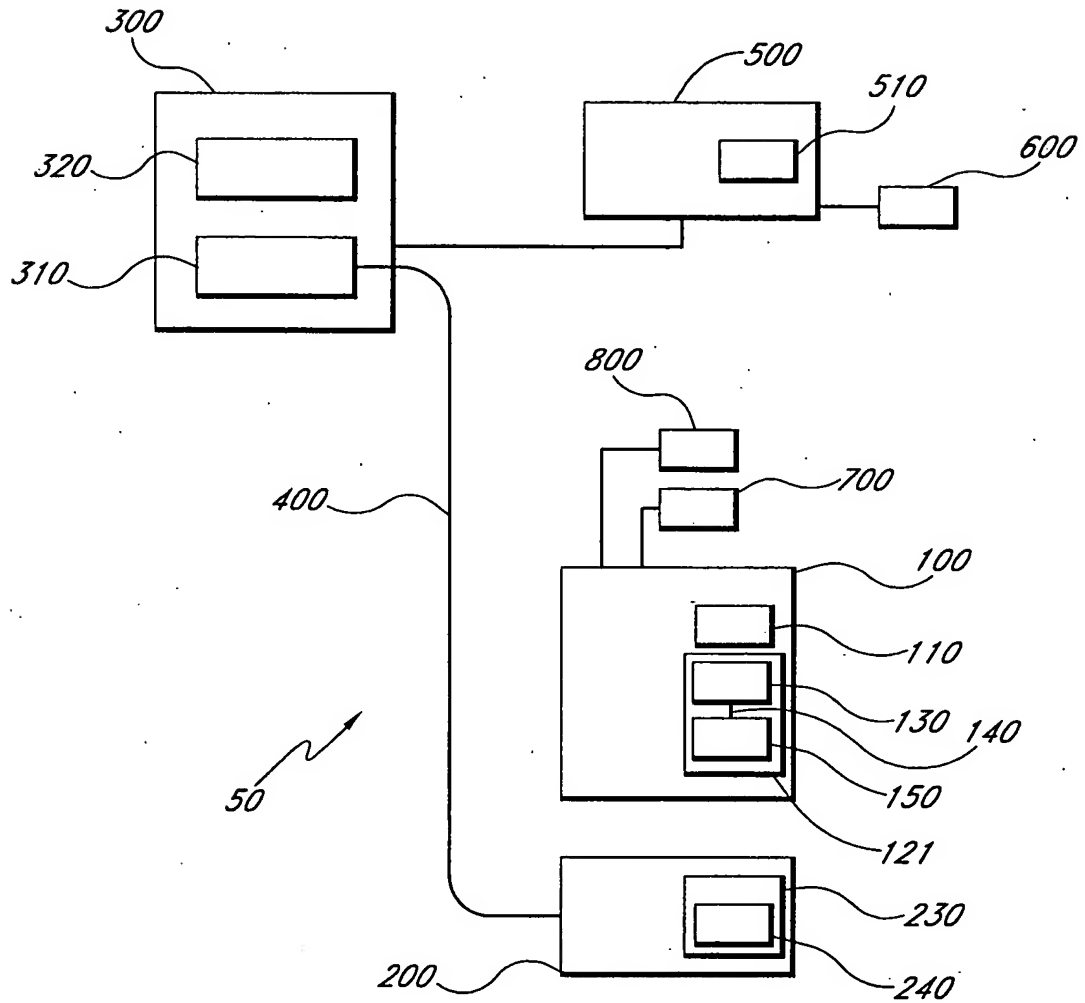


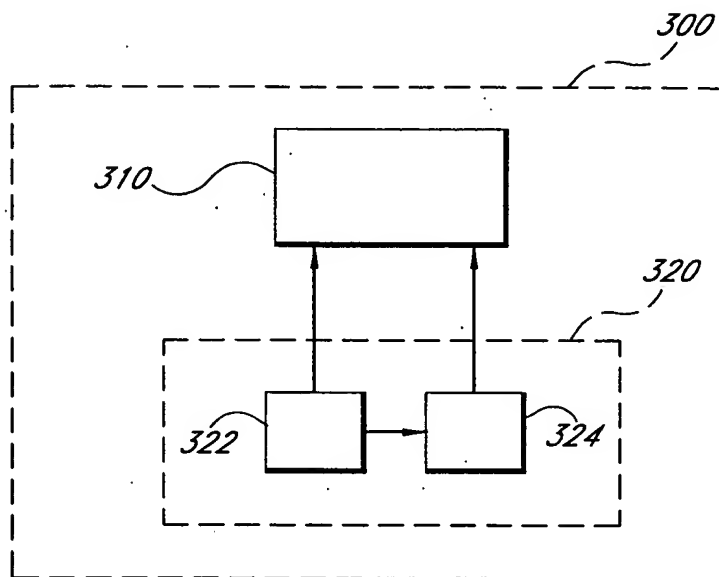
FIG. 1

*METHOD AND APPARATUS FOR MATERIAL PROCESSING*

*Inventors: Paul E. Denney et al.*

*Filed.: March 18, 2004    Atty Docket: LOMASR.021CPI*

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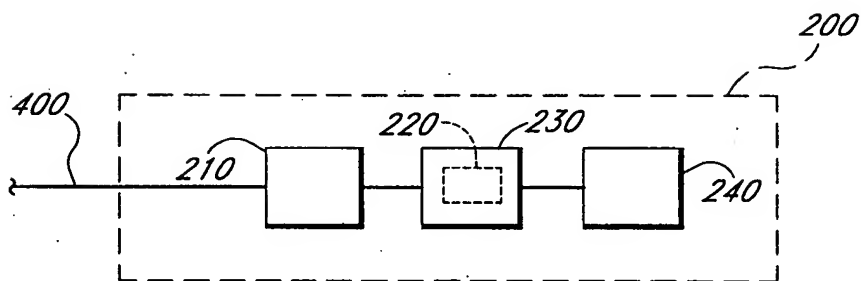
*FIG. 2*

*METHOD AND APPARATUS FOR MATERIAL PROCESSING*

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*FIG. 3A*

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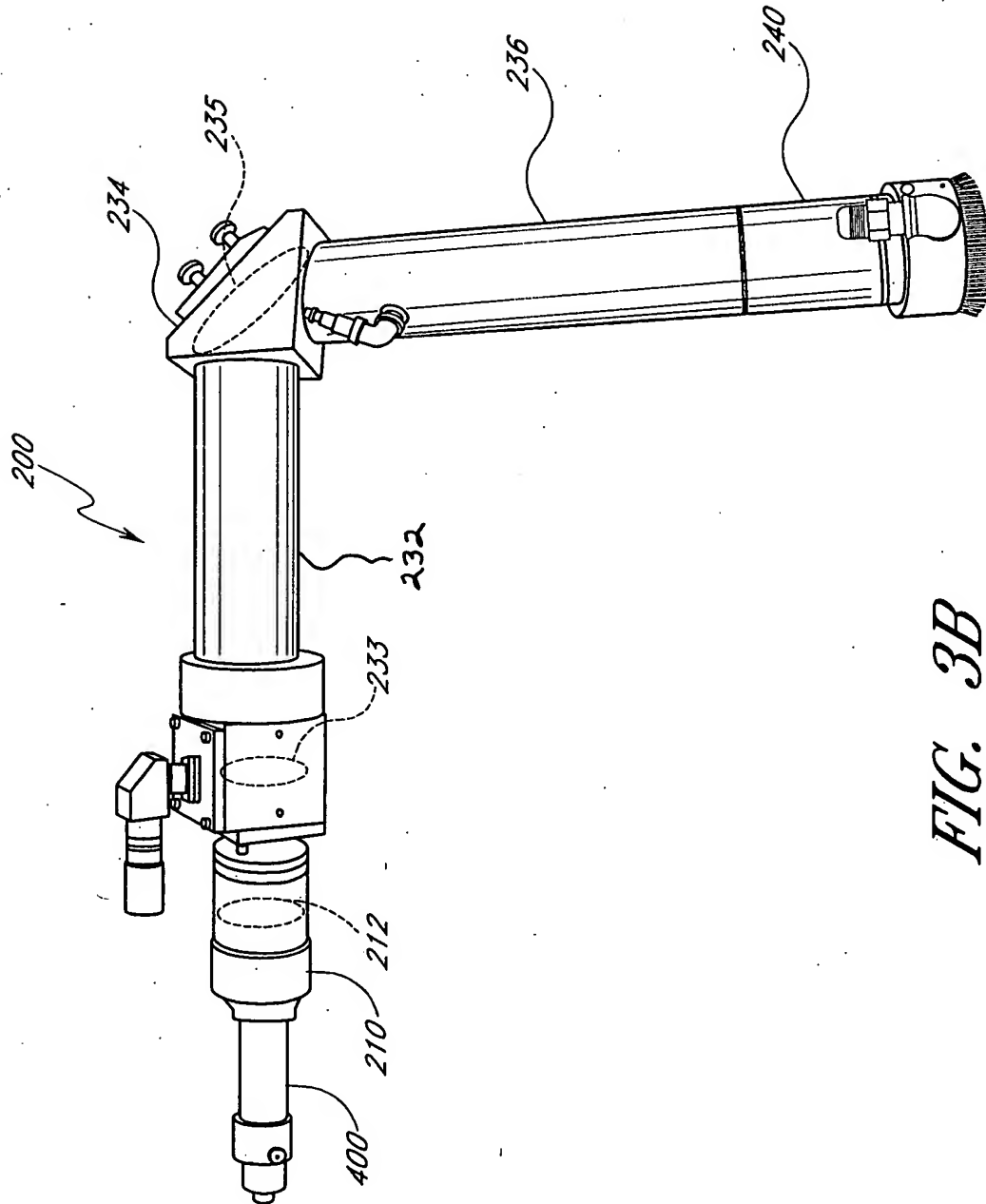


FIG. 3B

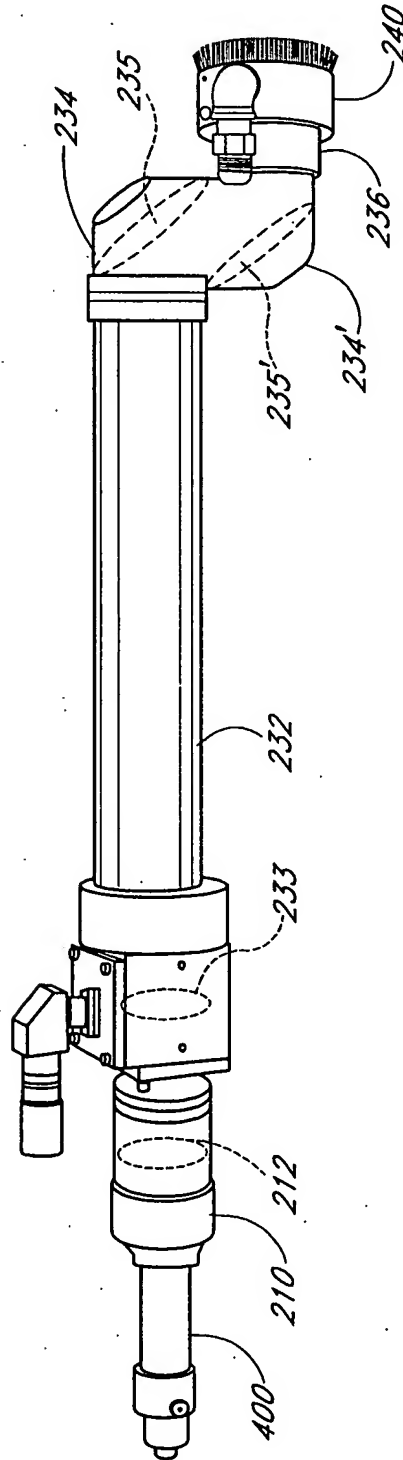


FIG. 3C

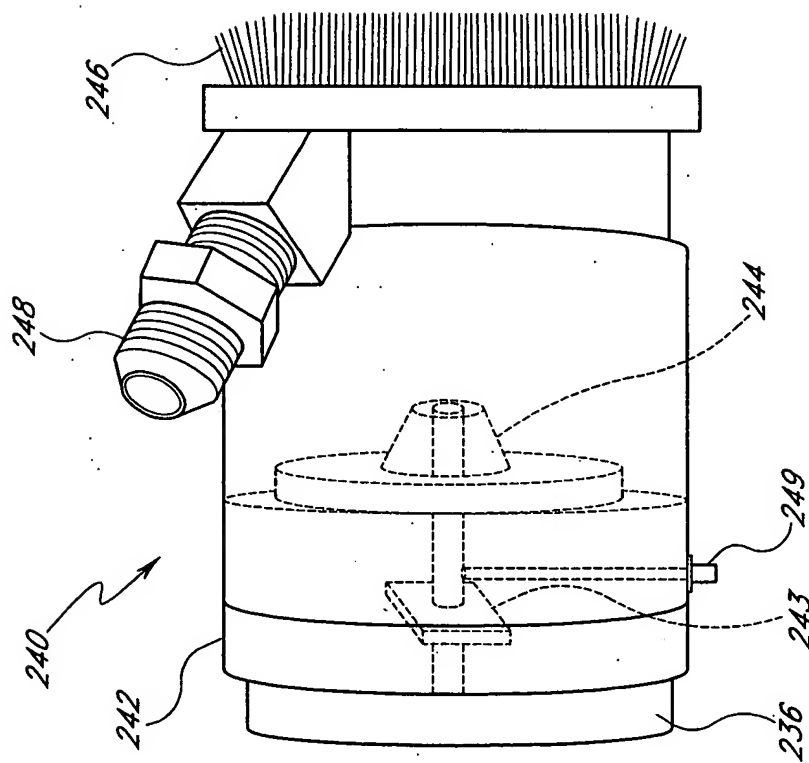


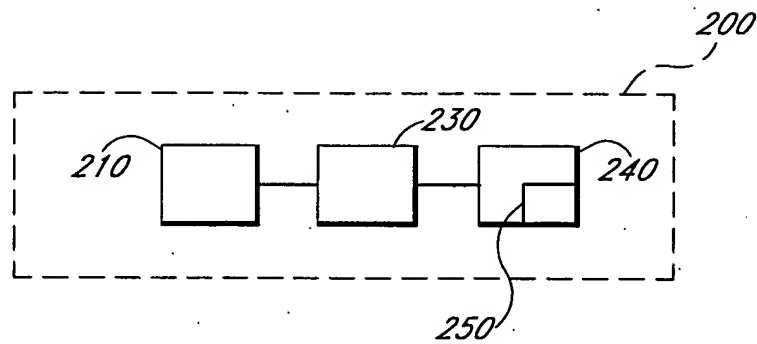
FIG. 4

*METHOD AND APPARATUS FOR MATERIAL PROCESSING*

*Inventors: Paul E. Denney et al.*

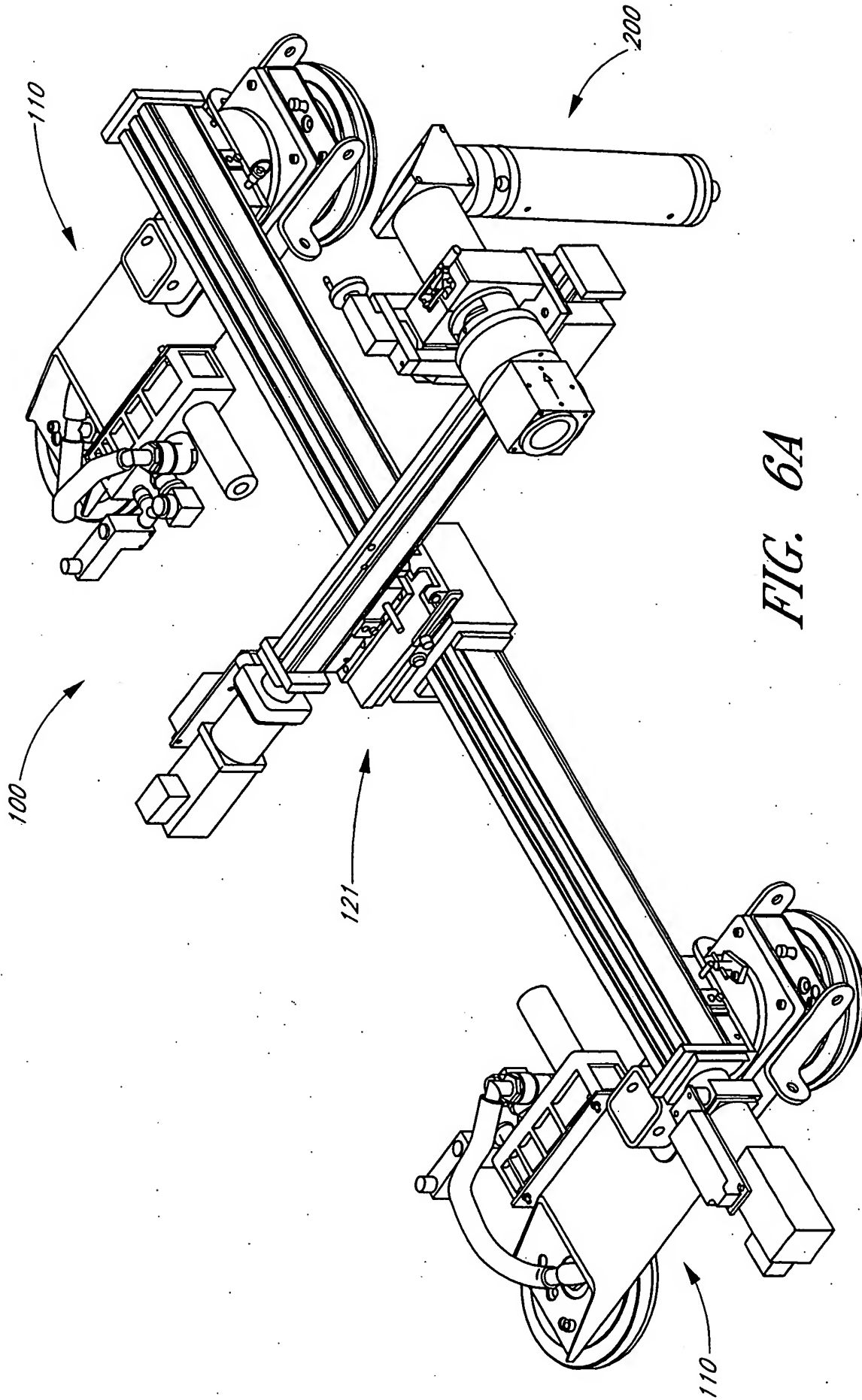
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*FIG. 5*





*FIG. 6A*

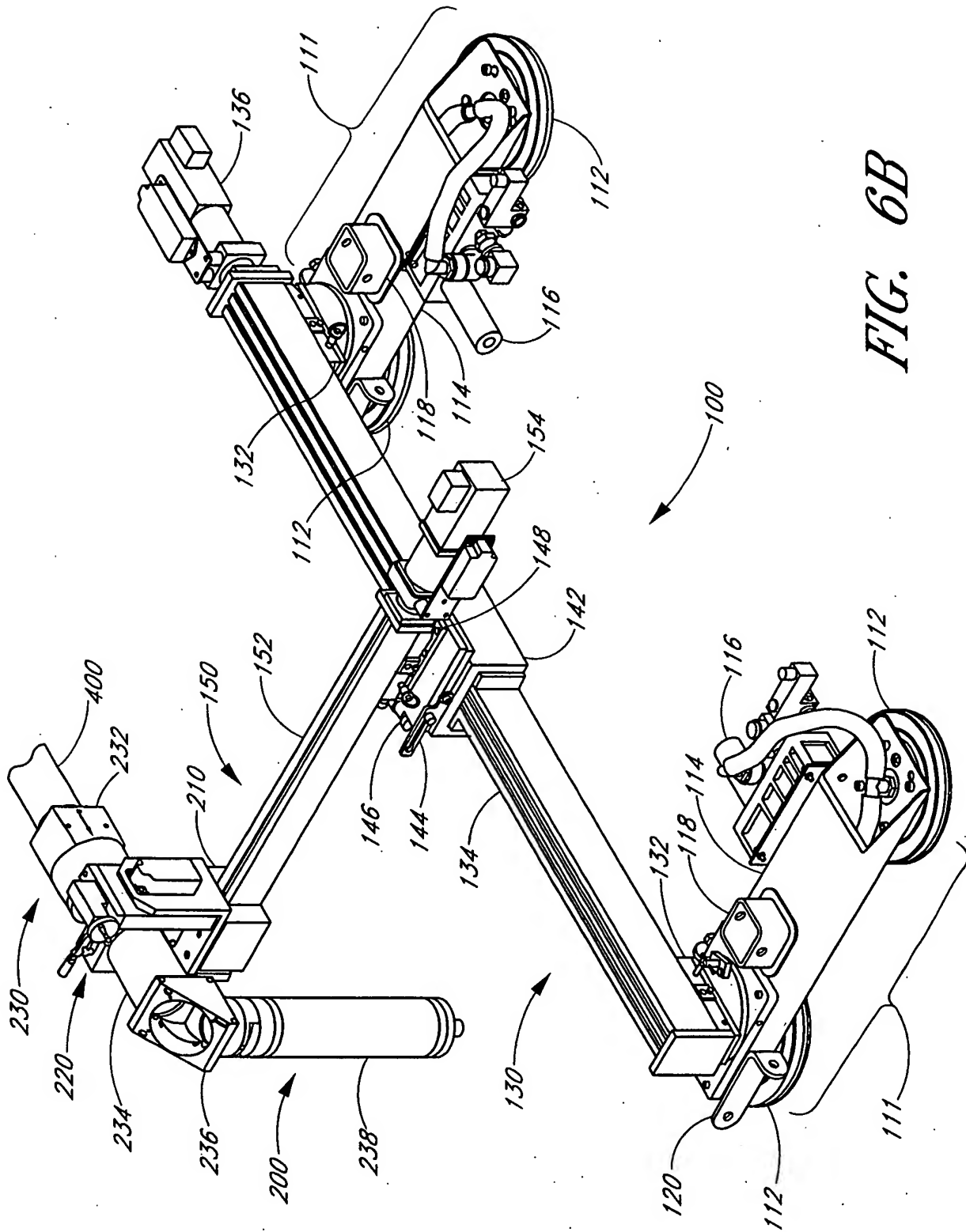


FIG. 6B

METHOD AND APPARATUS FOR MATERIAL PROCESSING

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Filed: March 18, 2004 Atty Docket: LOMASR.02/CPI

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METHOD AND APPARATUS FOR MATERIAL PROCESSING

Inventors: Paul E. Denney et al.

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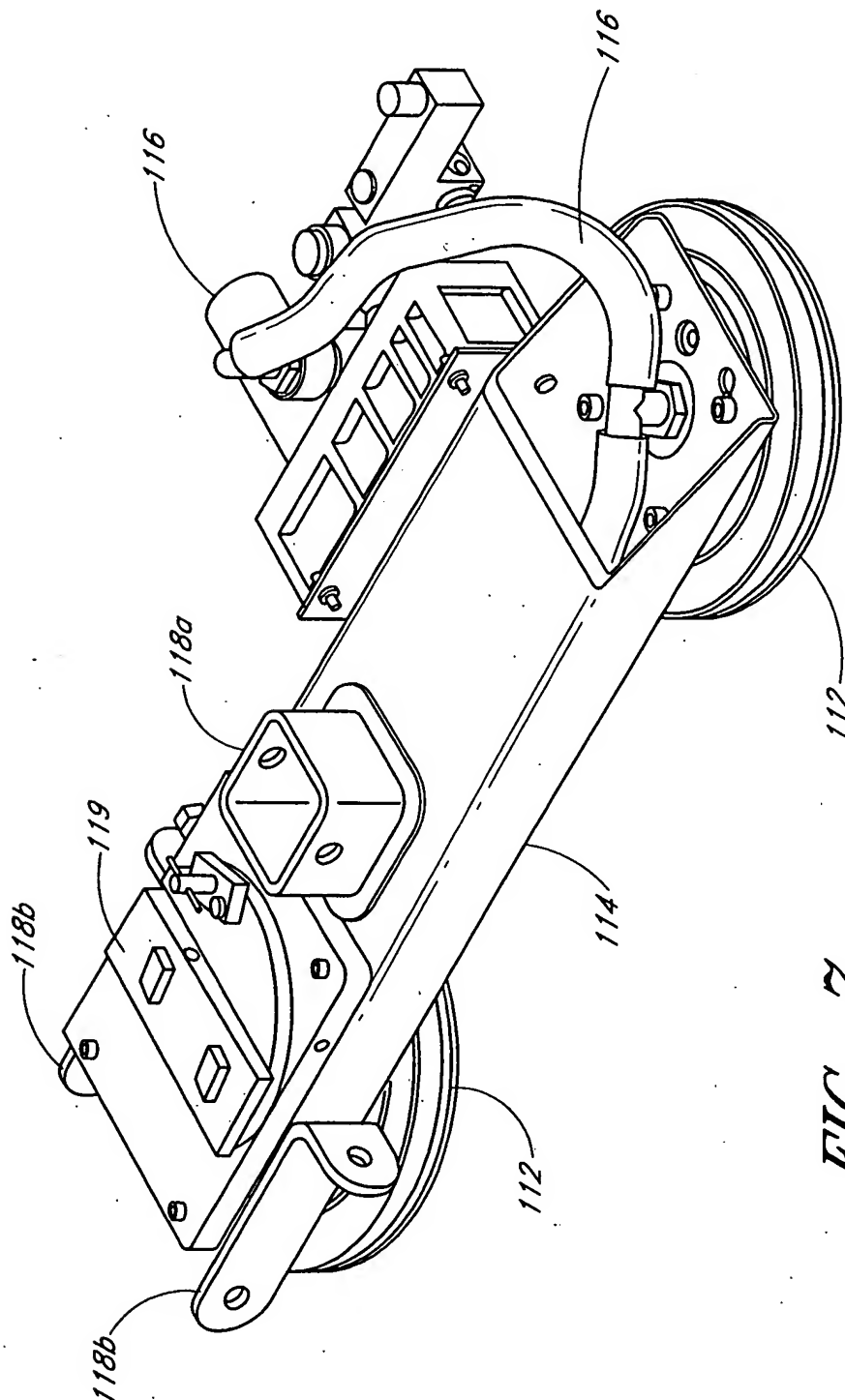


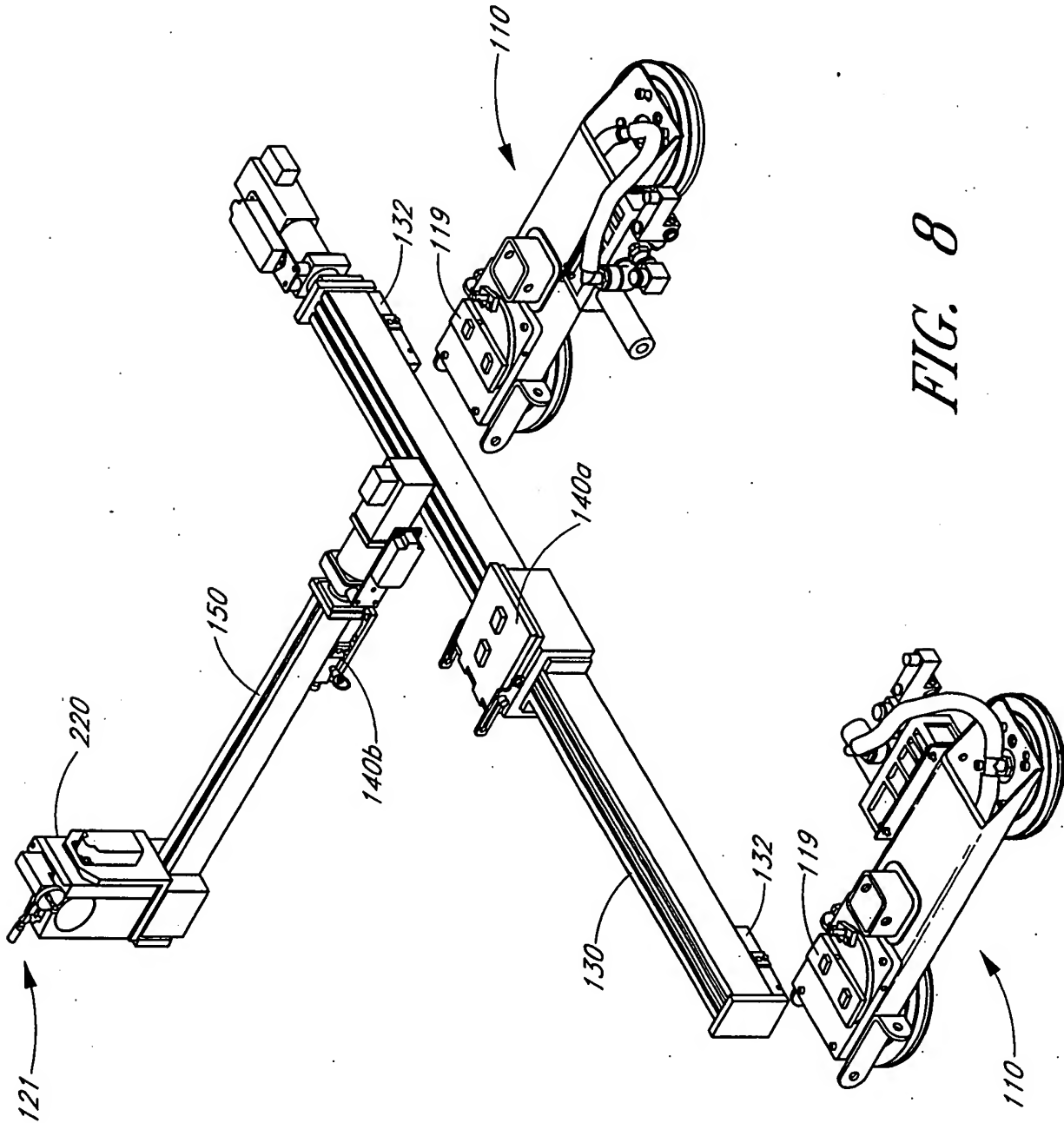
FIG. 7

METHOD AND APPARATUS FOR MATERIAL PROCESSING

Inventors: Paul E. Denney et al.

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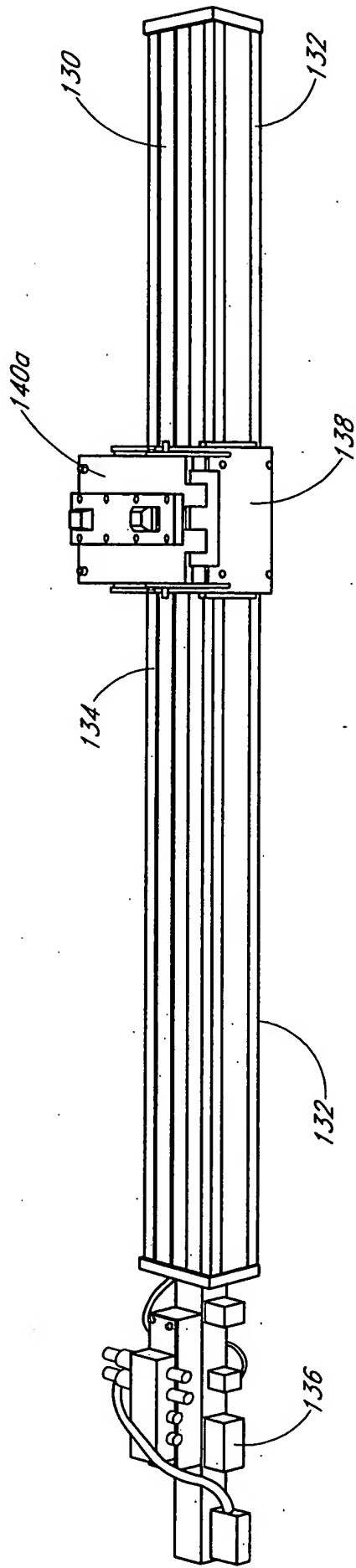
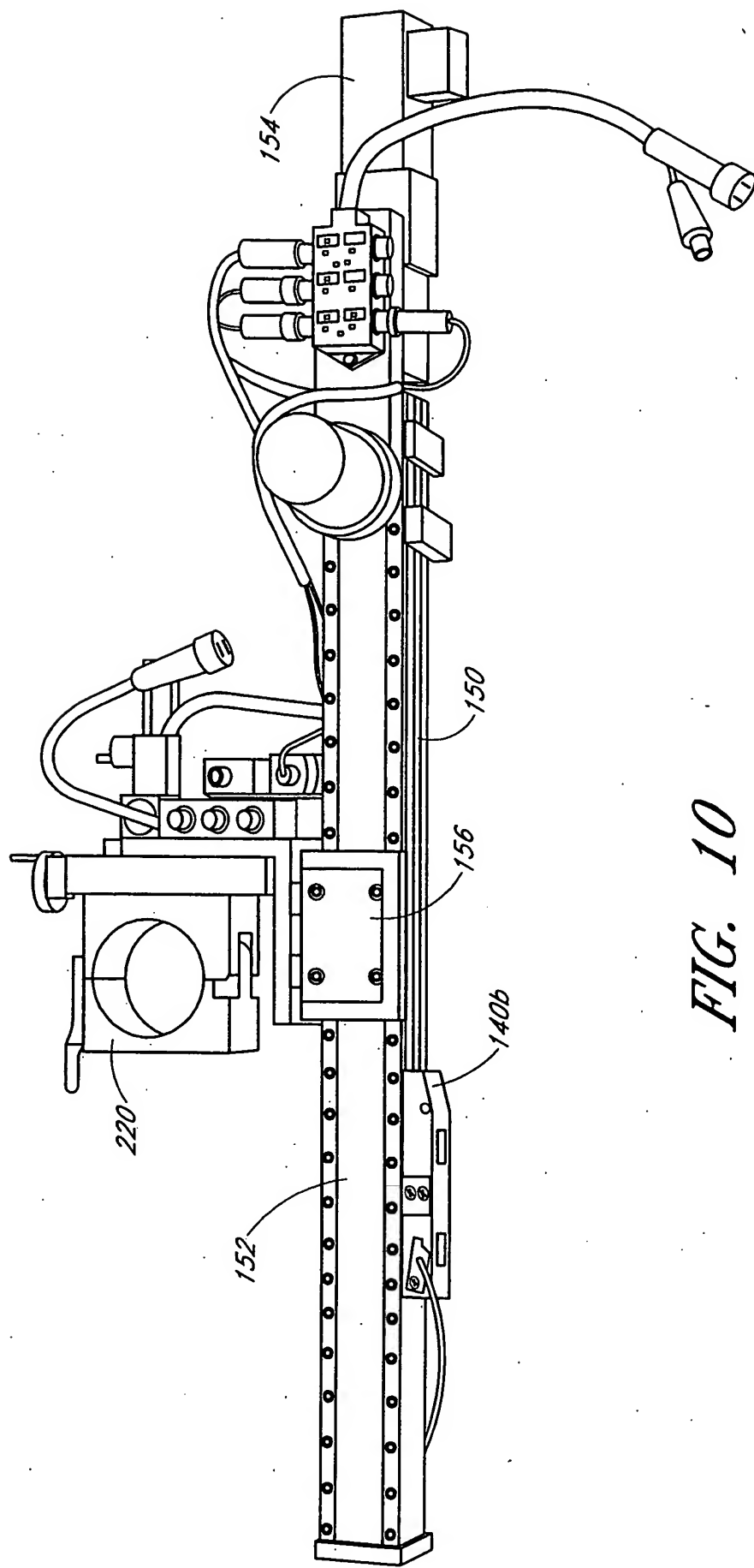
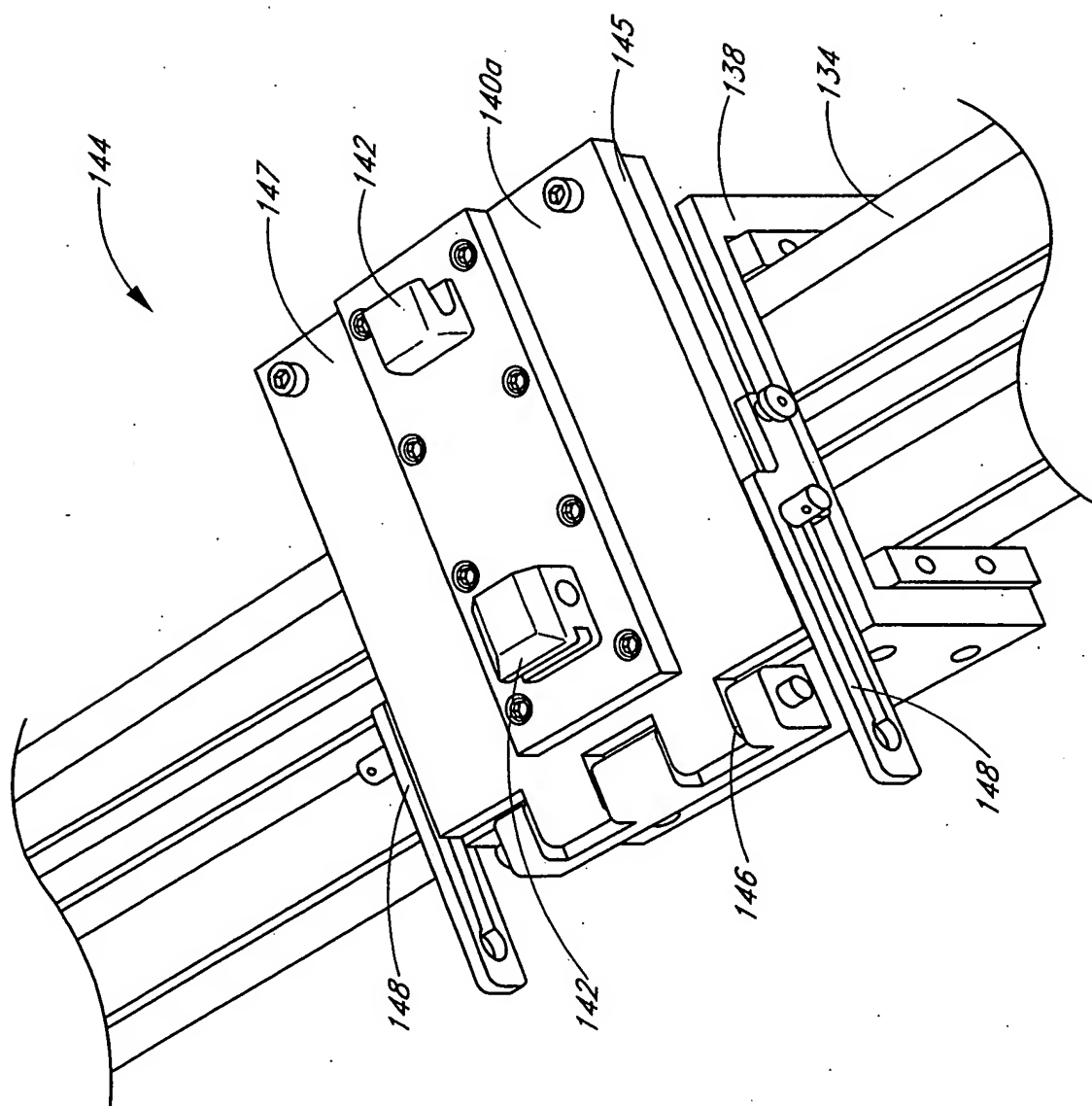


FIG. 9



**FIG. 10**

FIG. 11A

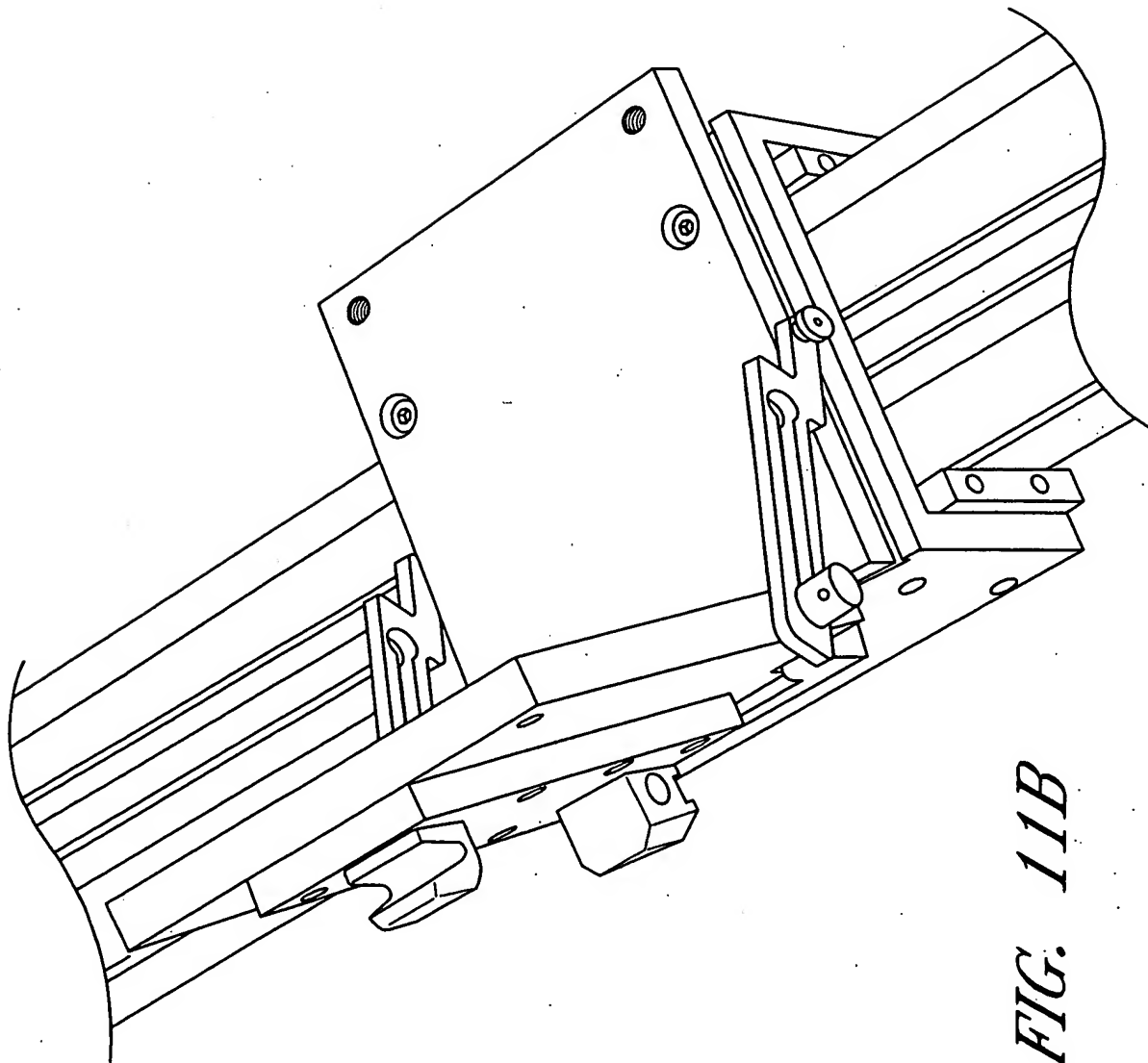


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*FIG. 11B*



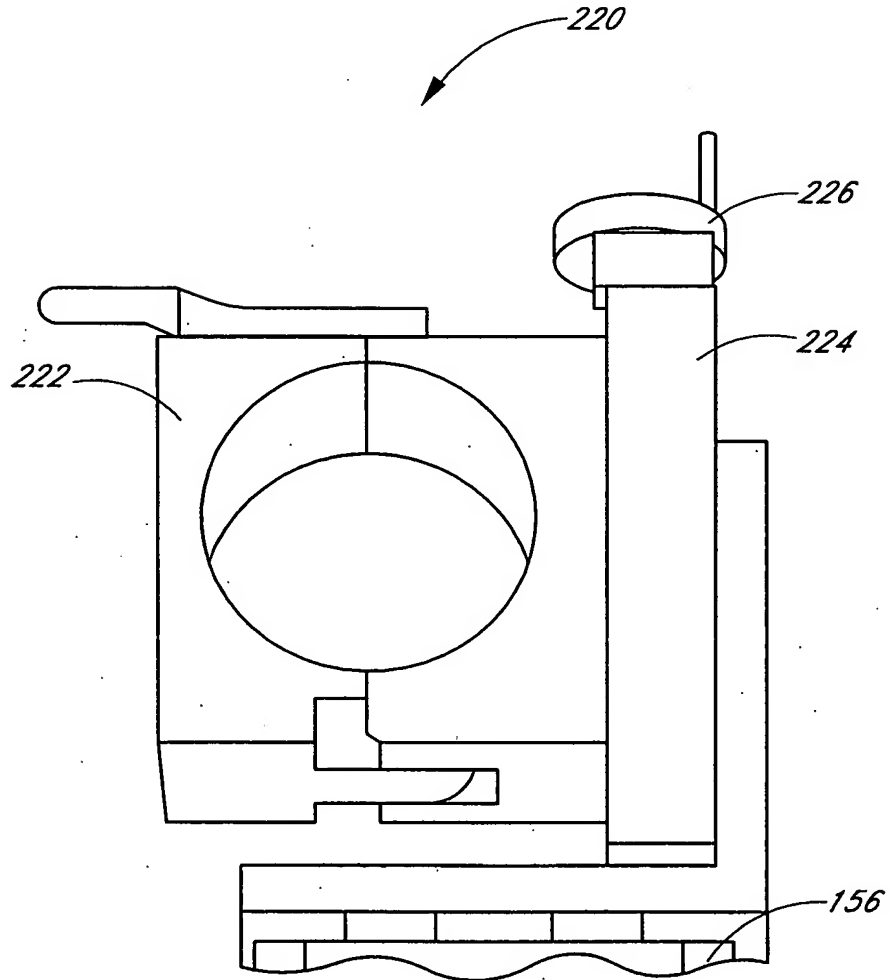


FIG. 12

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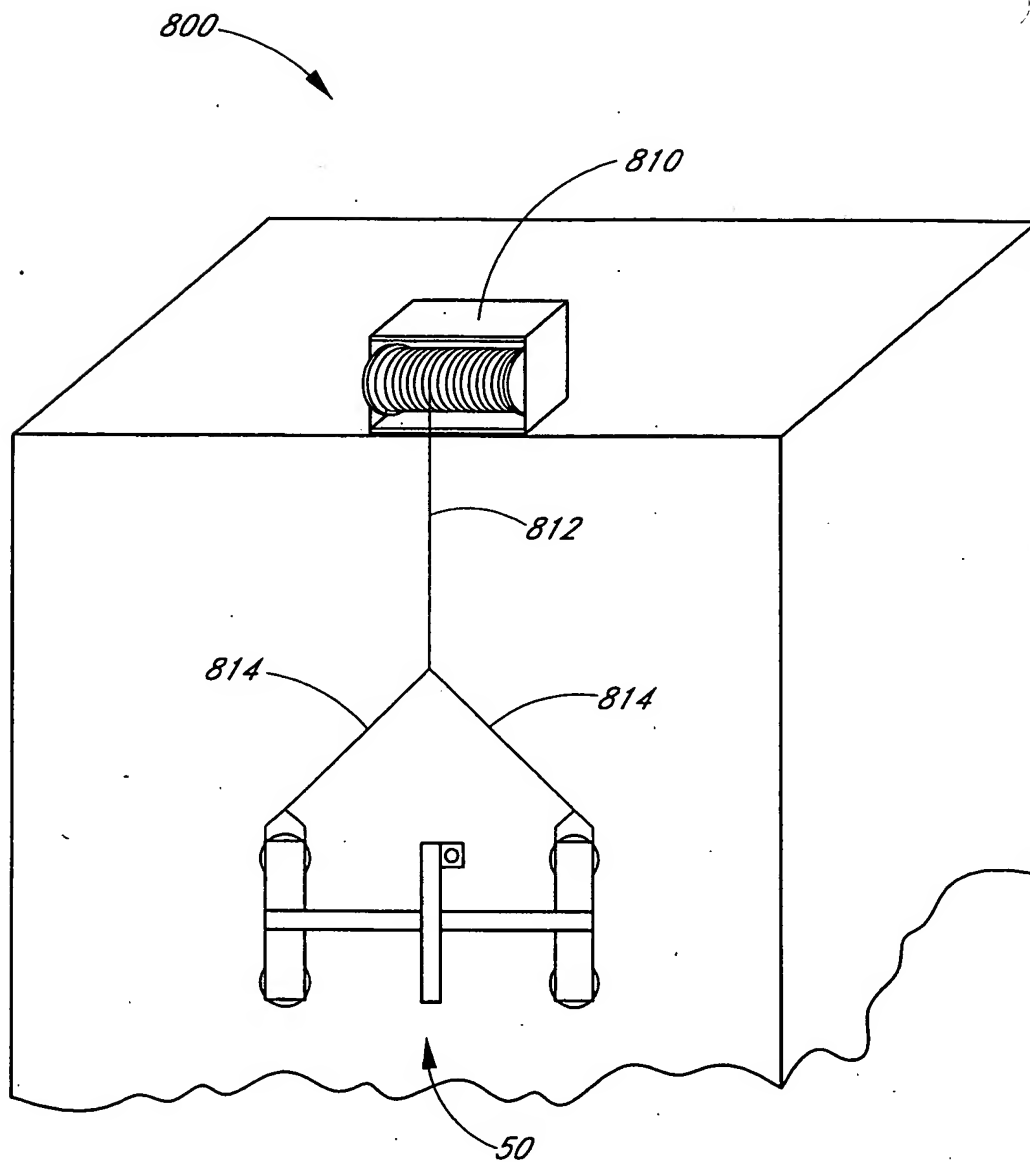
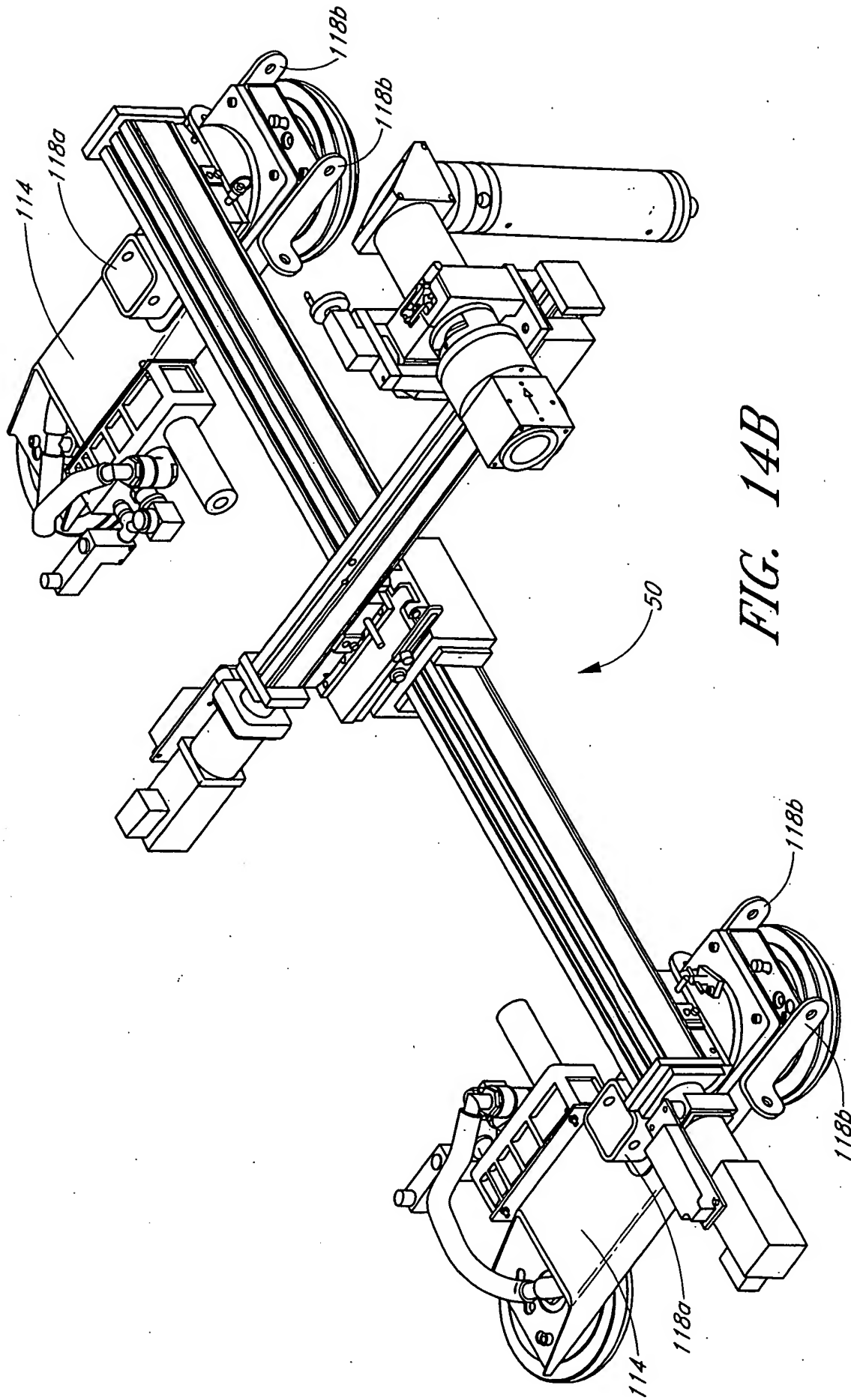


FIG. 14A



**FIG. 14B**

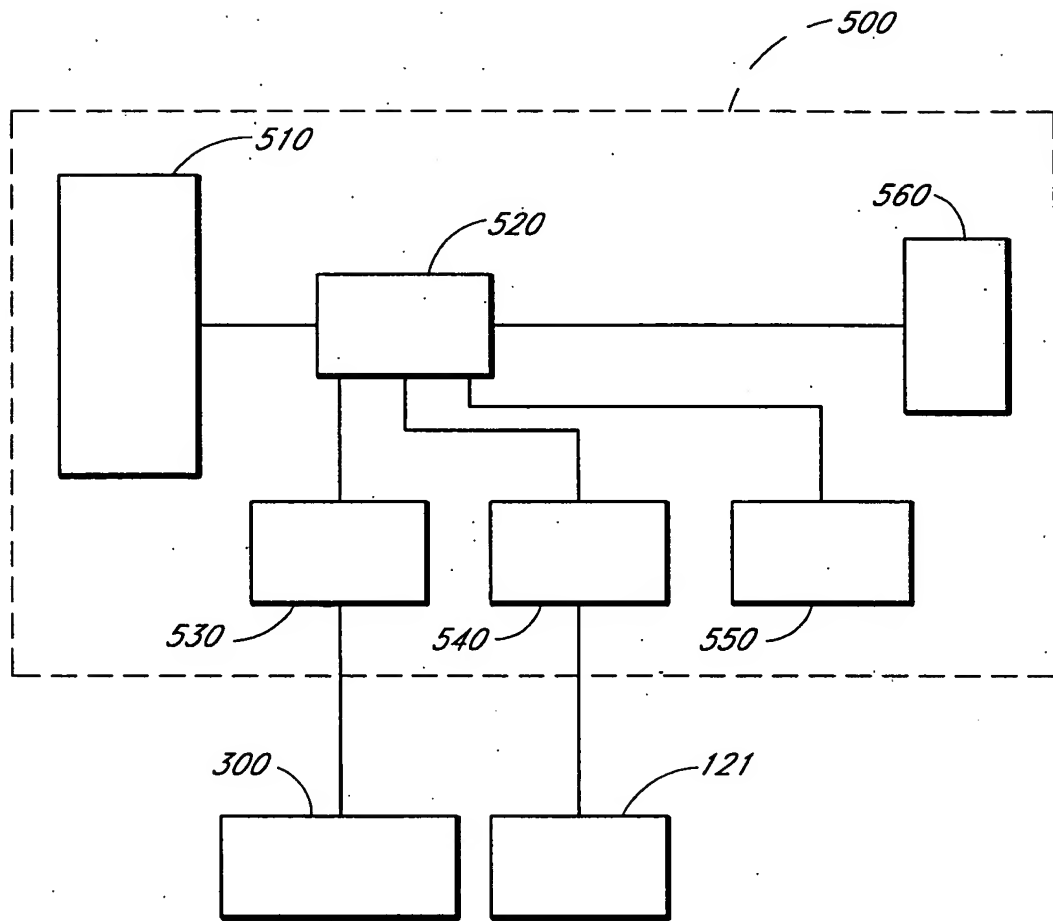


FIG. 15

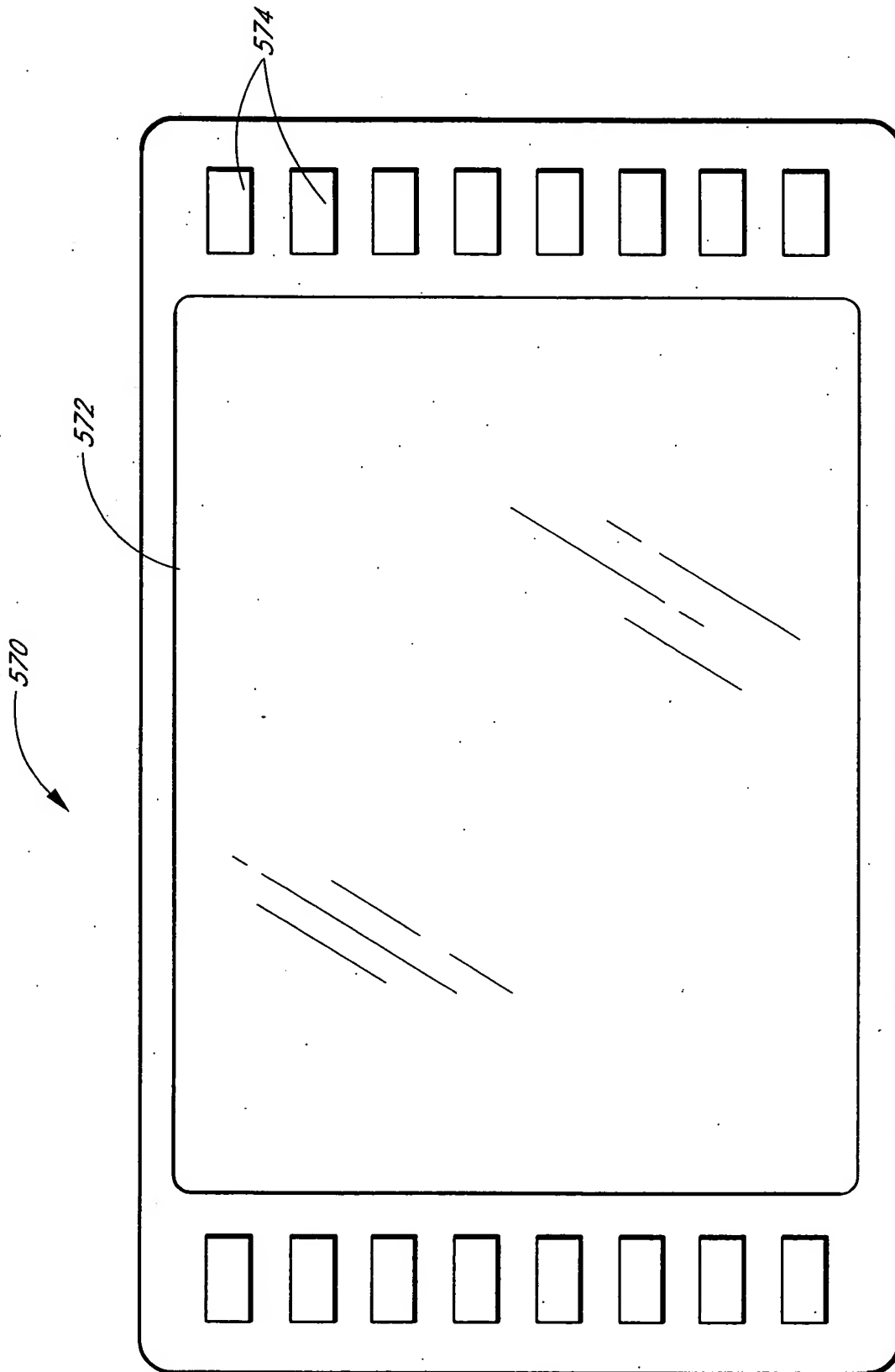


FIG. 16

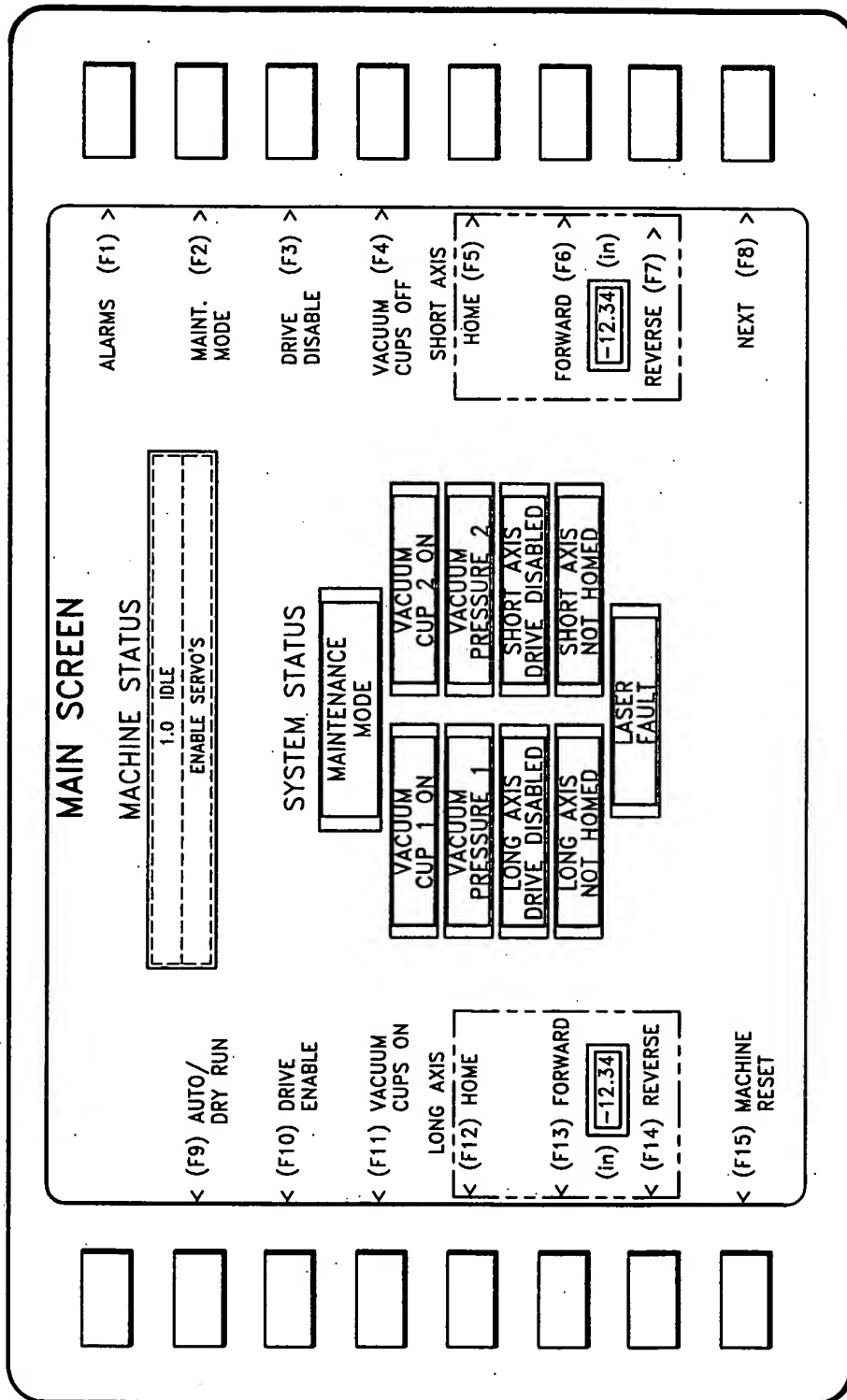


FIG. 17A

## SELECT OPERATION SCREEN

MACHINE STATUS

1.0 IDLE  
ENABLE SERVO'S

< (F9) AUTO/  
DRY RUN

LONG AXIS  
POSITION

-12.34 (in)

< (F11) CIRCLE

SYSTEM STATUS

MAINTENANCE  
MODE

< (F12) PIERCE

SHORT AXIS  
POSITION

-12.34 (in)

< (F13) STRAIGHT CUT

CIRCLE  
IDLE

< (F14) SURFACE  
KEYING

PIERCE  
IDLE

< (F15) MACHINE  
RESET

STRAIGHT CUT  
IDLE

SURFACE KEYING  
IDLE

NEXT (F8) >

FIG. 17B



**MACHINE STATUS**

1.0 IDLE  
ENABLE SERVO'S

**CIRCLE STATUS**

2.0 CIRCLE SEQUENCE IDLE  
PRESS CYCLE START TO BEGIN

**SYSTEM STATUS**

MAINTENANCE  
MODE

LONG AXIS  
POSITION  
[-12.34] (in)

CYCLE  
START  
< (F11)

SHORT AXIS  
POSITION  
[-12.34] (in)

CYCLE (F4)  
STOP

**CIRCLE PARAMETERS**

REVOLUTIONS

STATUS	1234
SET POINT	1234
COUNT	123

DIAMETER (in)

STATUS	-1.234
SET POINT	-1.234

TIME (sec)

STATUS	1234
SET POINT	1234

SPEED (in/min)

STATUS	-12.34
SET POINT	-12.34

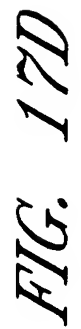
PROGRAM NUMBER

STATUS	12
SET POINT	12

< (F9) AUTO/  
DRY RUN

< (F15) MACHINE  
RESET

FIG. 17C



**FIG. 17D**

CUT SETUP/OPERATION SCREEN

MACHINE STATUS

1.0 IDLE  
ENABLE SERVO'S

CUT STATUS

4.0 CUT SEQUENCE IDLE  
PRESS CYCLE START TO BEGIN

SYSTEM STATUS

MAINTENANCE  
MODE

SHORT AXIS POSITION

-12.34 (in)

LONG AXIS POSITION

-12.34 (in)

SPEED (in/min)

STATUS -12.34  
SET POINT -12.34

LENGTH (in)

STATUS -12.34  
SET POINT -12.34

PROGRAM NUMBER

STATUS 12  
SET POINT 12

LONG AXIS NOT SELECTED

SHORT AXIS NOT SELECTED

CYCLE (F4) STOP

NEXT (F8) >

< (F9) AUTO/ DRY RUN

< (F11) CYCLE START

< (F13) LONG AXIS

< (F14) SHORT AXIS

< (F15) MACHINE RESET

CYCLE (F4) STOP

NEXT (F8) >

FIG. 17E

**SURFACE KEYING SETUP/OPERATION SCREEN**

< (F9) AUTO/  
DRY RUN

**MACHINE STATUS**

1.0 IDLE  
ENABLE SERVO'S

**SURFACE KEYING STATUS**

5.0 KEYING SEQUENCE IDLE  
PRESS CYCLE START TO BEGIN

CYCLE (F4) >  
STOP

< (F11) CYCLE  
START

**SYSTEM STATUS**

MAINTENANCE  
MODE

SHORT AXIS  
POSITION  
[-12.34] (in)

LONG AXIS  
POSITION  
[-12.34] (in)

**SURFACE KEYING PARAMETERS**

LBU  
PROGRAM NUMBER

STATUS 12

SET POINT 12

SHORT AXIS  
LENGTH (in)

STATUS -12.34

SET POINT -12.34

LONG AXIS  
LENGTH (in)

STATUS -12.34

SET POINT -12.34

OFFSET (in)

STATUS -12.34

SET POINT -12.34

< (F15) MACHINE  
RESET

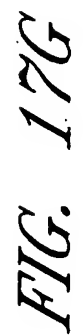
**SPEED (in/min)**

STATUS -12.34

SET POINT -12.34

NEXT (F8) >

FIG. 17F



### MAINTENANCE SCREEN

WARNING:  
OPERATION FROM THIS SCREEN  
BYPASSES SYSTEM INTERLOCKS

SYSTEM STATUS

MAINTENANCE  
MODE

VACUUM  
CUP 1 ON

VACUUM  
CUP 2 ON

VACUUM  
PRESSURE 1

VACUUM  
PRESSURE 2

LONG AXIS  
DRIVE DISABLED

SHORT AXIS  
DRIVE DISABLED

LASER AIR  
SOLENOID OFF

LASER AIR  
PRESSURE

LONG AXIS  
NOT HOMED

SHORT AXIS  
NOT HOMED

LASER  
FAULT

JOG SPEED  
(in/min)

STATUS -12.34

SET POINT -12.34

< (F9) AUTO/  
DRY RUN

< (F10) DRIVE  
ENABLE

< (F11) VACUUM  
CUPS ON

LONG AXIS  
< (F12) HOME

< (F13) FORWARD  
(in) -12.34

< (F14) REVERSE

< (F15) MACHINE  
RESET

ALARMS (F1) >

LASER AIR (F2) >  
ON/OFF

DRIVE (F3) >  
DISABLE

VACUUM (F4) >  
CUPS OFF

SHORT AXIS  
HOME (F5) >

FORWARD (F6) >  
(in) -12.34

REVERSE (F7) >

NEXT (F8) >

FIG. 17H

Figure 18A:

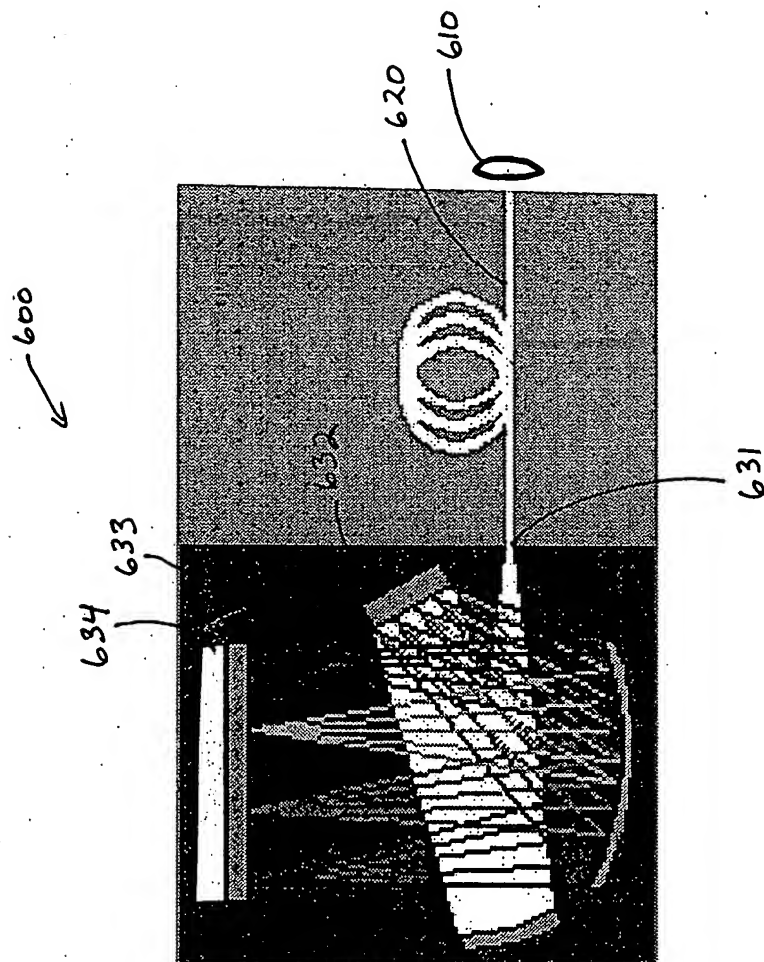
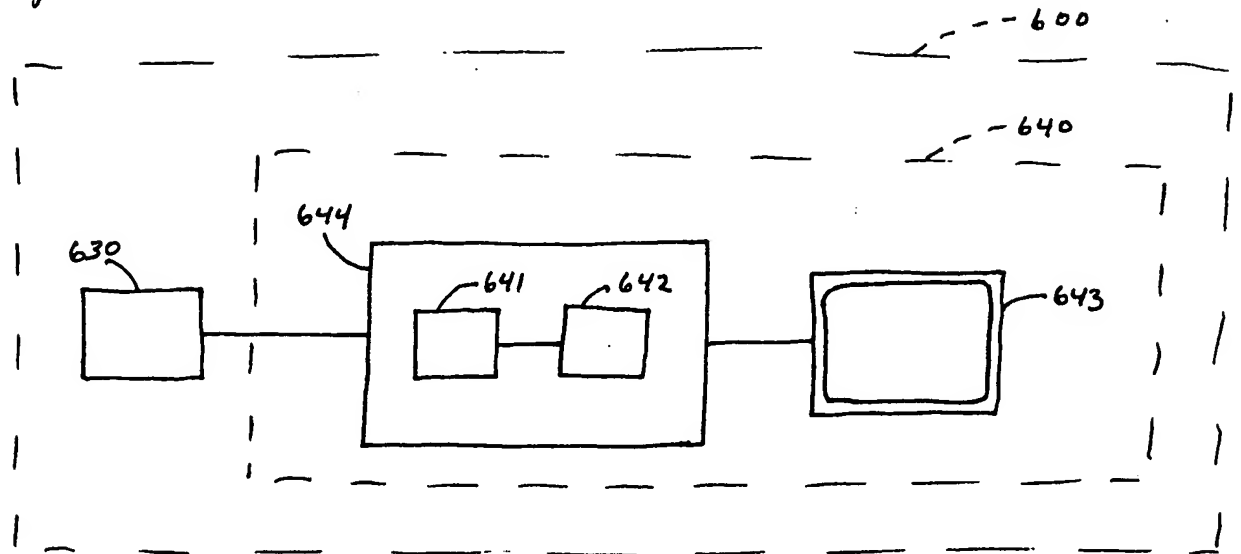


Figure 18B:





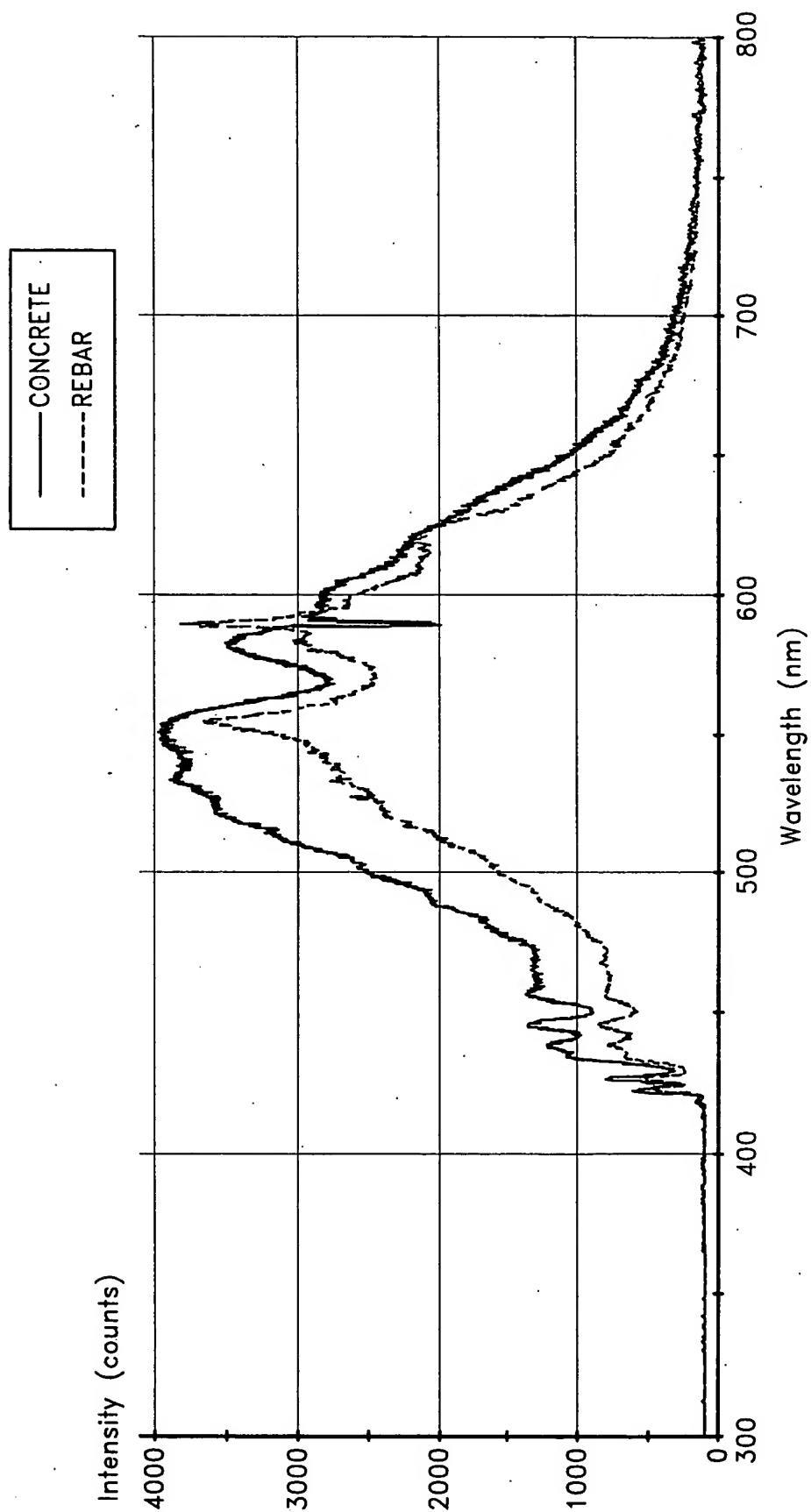


FIG. 19

Figure 20:

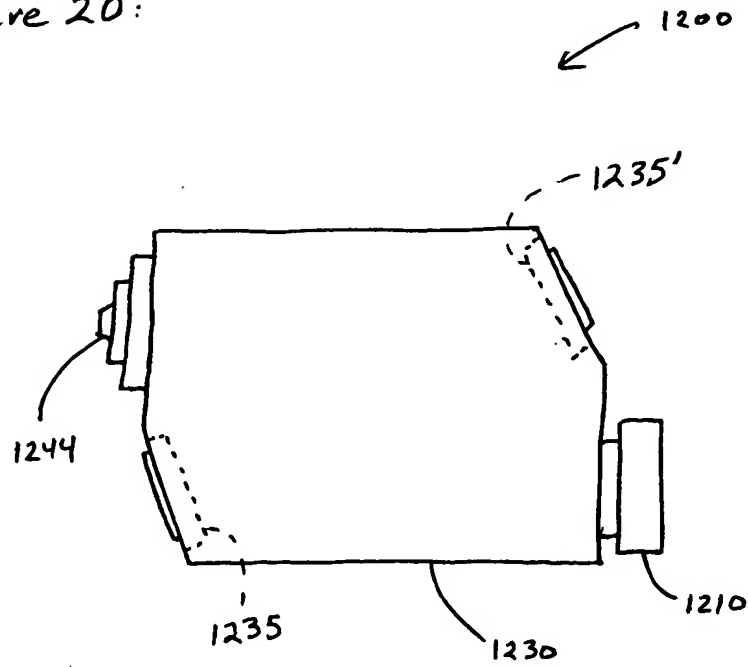


Figure 21A:

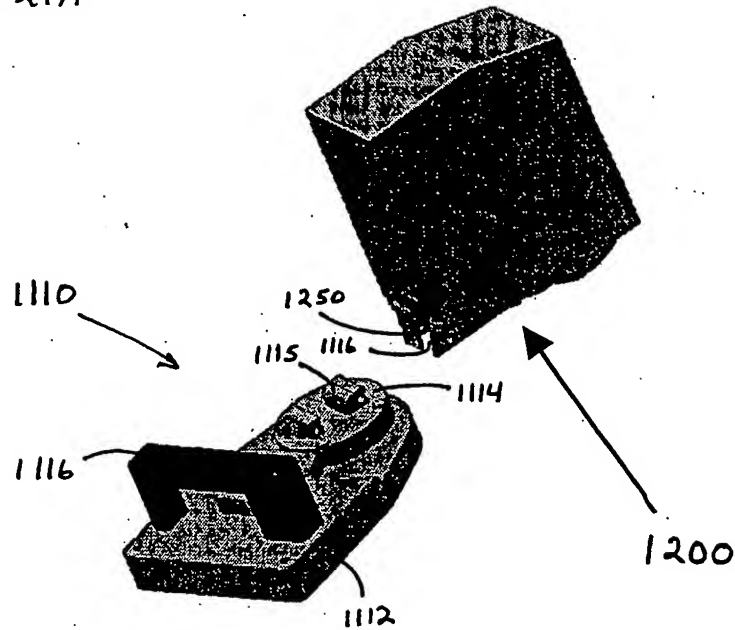
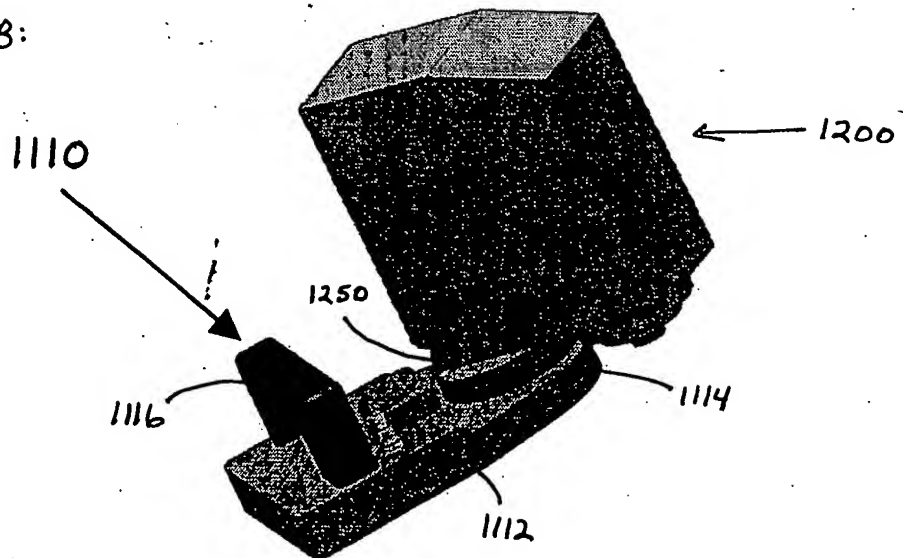


Figure 21B:



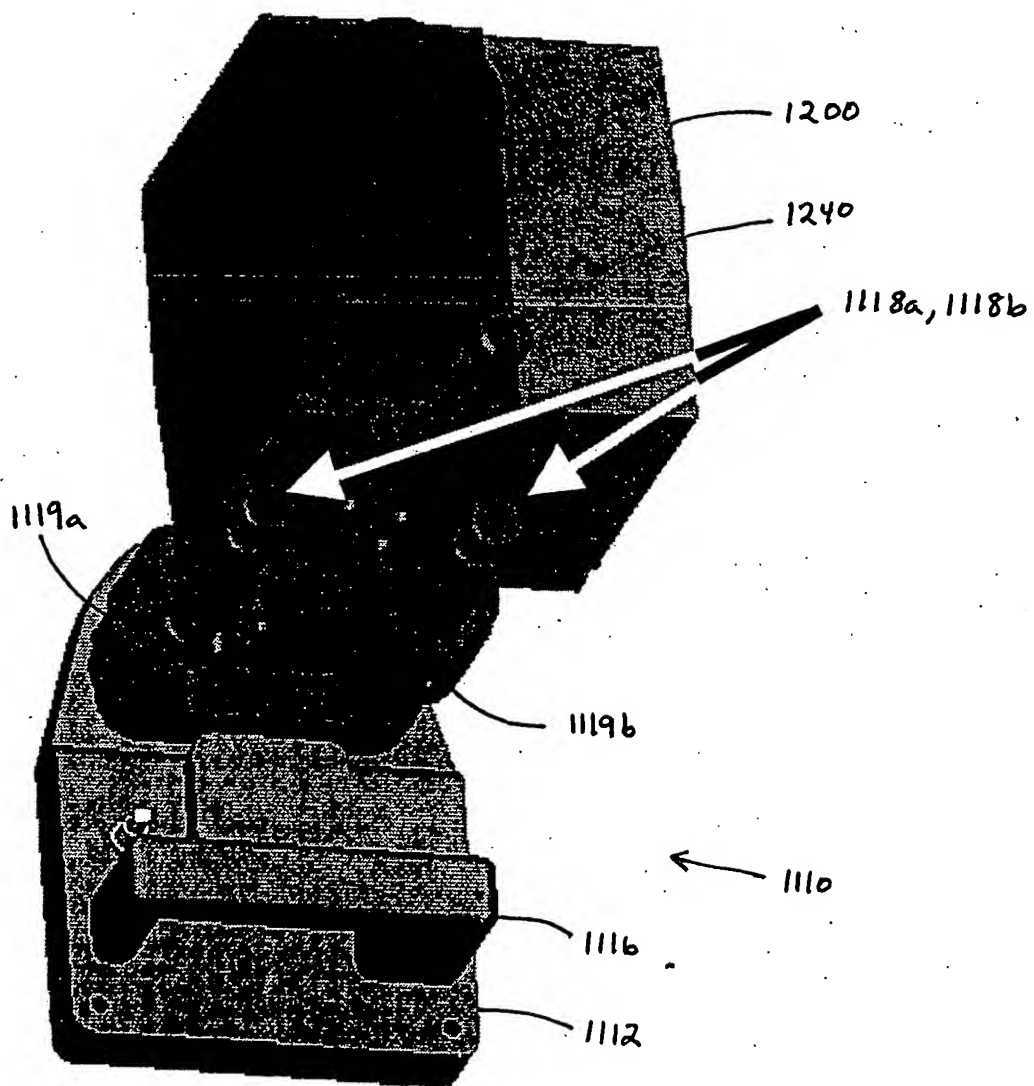
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Figure 21C:



METHOD AND APPARATUS FOR MATERIAL PROCESSING

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Figure 210:

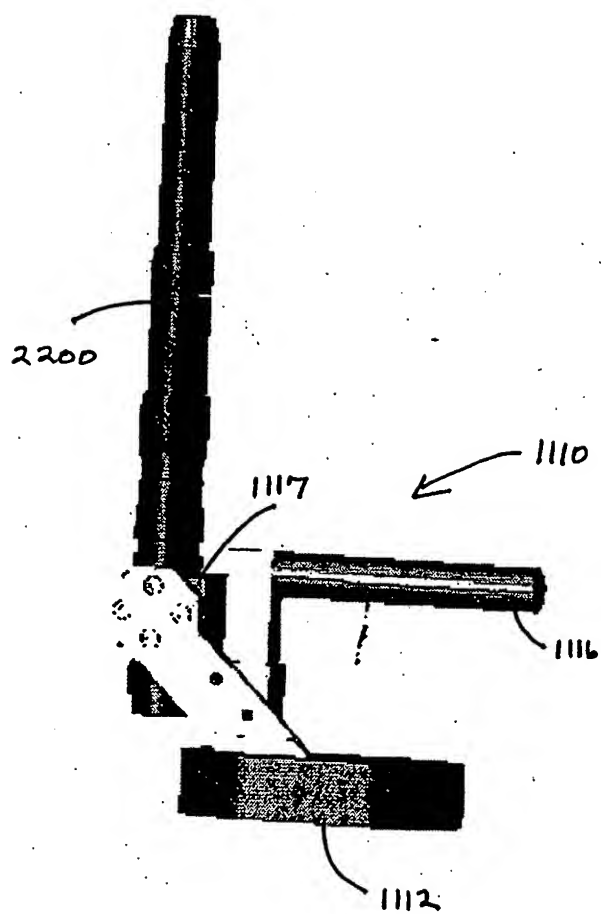


Figure 22:

